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(71) Applicant: HARRIS CORPORATION [US/US]; 1025 West Nasa Boulevard, Melbourne, FL 32919 (US).

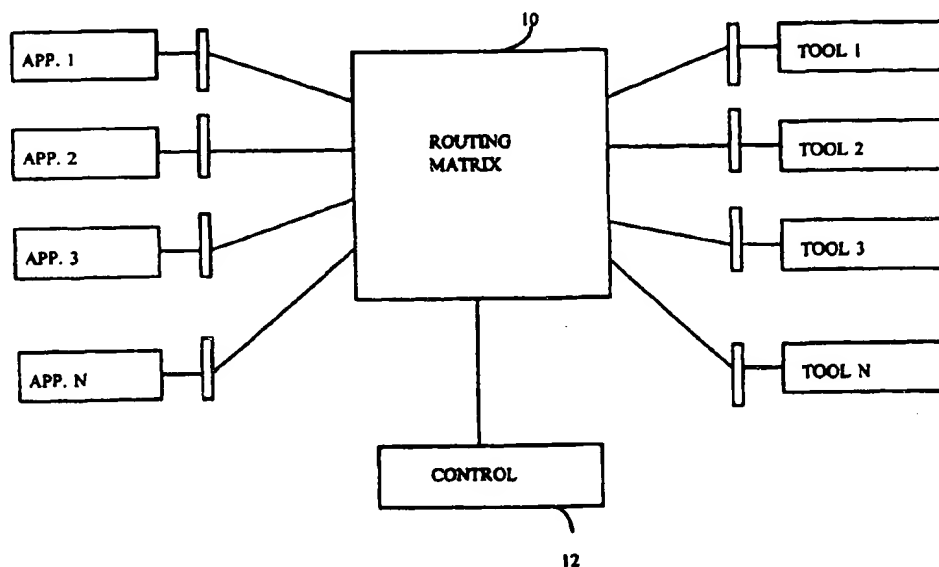
(72) Inventors: BAILIS, Jason; 40 Bridle Lane, Novato, CA 94945 (US). SAMSONOV, Max; 15-40 Bestruzhevskaya Street, St. Petersburg, 195271 (RU).

(74) Agents: ROGERS, L., Lawton, III et al.; Rogers & Killeen, Suite 400, 510 King Street, Alexandria, VA 22314 (US).

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(54) Title: DIAGNOSTIC SYSTEM AND METHOD FOR MONITORING PLURAL SOFTWARE APPLICATIONS USING PLURAL DIAGNOSTIC TOOLS



(57) Abstract

A diagnostic system and method for a plurality of computer applications in which events from plural common configurable routing matrix (10) for routing to one or more of a plurality of diagnostic monitors, recorders or logs. The routing matrix is configurable in real time by a server (12). All applications, without regard to server or topology, communicate via the standardized computer network protocol (and Internet), effectively abstracting all applications from the server on which they are running.

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DIAGNOSTIC SYSTEM AND METHOD FOR MONITORING PLURAL SOFTWARE APPLICATIONS USING PLURAL DIAGNOSTIC TOOLS

BACKGROUND OF THE INVENTION

It is common to perform diagnostics on the data produced as a result of the running of a computer software application. Examples of such software applications include enhanced telephone services such as prepaid telephone long distance calling services. Each of these applications may have a different protocol in which the data therefrom is available.

Common diagnostics include Simple Network Management Protocol ("SNMP") translations, the creation of event logs, performance monitors, and displays. Each of these diagnostic tools may require that the data it receives be in a specified format.

Several diagnostic tools are available, e.g., graphical tables and histograms, visible alarms, statistics correlation logs, etc. It is often desirable to perform more than one diagnostic on an application, and it is often desirable to change the diagnostic(s) being performed on an application.

It has been the practice to connect known diagnostic tools directly to the servers on which a particular application is run and to provide the specific interface necessary to convert the data provided by the application to the format required by the diagnostic tool. Where two or more diagnostics are applied to the data from a single application, it has generally been necessary to utilize additional interface circuits. When a change in the diagnostic is desired, it has generally been necessary to reconnect the components through appropriate interfaces on an application-by-application basis, resulting in considerable delay. In addition, correlation of data from more

than one application or server has required considerable interface complexity and often can not be accomplished at all with common diagnostic tools.

Accordingly, it is an object of the present invention to provide a novel diagnostic system and method which obviates many of the deficiencies of known systems.

It is another object of the present invention to provide a novel diagnostic system and method in which both sources of data and the diagnostic tools are abstracted.

It is yet another object of the present invention to provide a novel diagnostic system and method in which the physical location of both data sources and diagnostic tools is transparent to both sources and tools, i.e., network topology is abstracted from both data sources and diagnostic tools.

It is still another object of the present invention to provide a novel diagnostic system and method in which the assignment of diagnostic tools to a software application is selective in real time.

It is a further object of the present invention to provide a novel diagnostic system and method of providing a unified application programming interface wrapper around specific tools provided by Windows NT.

It is still another object of the present invention to provide a novel diagnostic system and method which implements a clearinghouse concept in software.

It is yet another object of the present invention to provide a novel diagnostic system and method in which a single tool may simultaneously monitor plural applications or servers

in order to correlate diagnostic data with respect to time or common events.

These and many other objects and advantages of the present invention will be readily apparent to one skilled in the art to which the invention pertains from a perusal of the claims, the appended drawings, and the following detailed description of the preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a functional block diagram of a prior art diagnostic system for N software applications and N diagnostic tools.

Figure 2 is a functional block diagram of the diagnostic system of the present invention for N software applications and M tools.

DESCRIPTION OF PREFERRED EMBODIMENTS

As shown in Figure 1, the prior art diagnostics for various software applications was generally on a one-to-one basis, i.e. each application such as App. N was directly connected to a specific diagnostic tool such as Tool M, although two applications such as App.1 and App.2 may be connected to a single diagnostic tool Tool1, and a single application App.3 may be connected to two tools Tool2 and Tool3.

Exemplary applications in the environment of an enhanced services telephone system, particularly a prepaid long distance calling system, include call processing, data base management, and infrastructure management. Exemplary diagnostic tools

include the NT Performance Monitor, the NT Event Logger, the NT Task Manager and an extendible SNMP Agent.

In contrast with this one-to-one relationship between applications and the diagnostic tools, the present invention as shown in Figure 2 converts the application specific output signals from each application to a common protocol such as the Component Object Model ("COM") protocol. As a practical matter, the routing matrix 10 may need only interface for each different protocol in which the various applications provide data, each application with a common protocol may provide it to the routing matrix through the same interface.

The present invention also converts the common protocol of the routing matrix to the tool specific protocol for application to the various tools. As a practical matter, the switch matrix may require only one output interface for each different type of protocol required by the diagnostic tools.

The selective connection of the data from each application to one or more diagnostic tools may be accomplished in the suitable conventional routing matrix 10 under the control of a suitable conventional control server 12.

In addition to the potential saving in the number of interfaces required for a given number of applications and diagnostic tools, the present invention provides great flexibility in the assignment of diagnostic tools to an application in real time. This may be accomplished remotely using Web technology.

However, the most significant advantage of the present invention may be the connection of the routing matrix to a local area network, wide area network, or to the Internet, so

that the diagnostic tools may be physically located at sites widely spaced from any or all applications, and all may be different from the site of the control server. To each

application and to each diagnostic tool, each of the others appears to be a virtual component.

In the present system, the routing data may be selectively filtered to prevent the transmission of data not needed by a specific tool and particular configurations developed to diagnose or monitor a particular scenario may be stored for later recall.

The dynamic addition and deletion of sources and destinations provides great flexibility and new destination may be added via published API.

While preferred embodiments of the present invention have been described, it is to be understood that the embodiments described are illustrative only and the scope of the invention is to be defined solely by the appended claims when accorded a full range of equivalence, many variations and modifications naturally occurring to those of skill in the art from a perusal hereof.

WHAT IS CLAIMED IS:

1. A diagnostic system comprising:
 - input means adapted to receive data relating to events from plural software applications;
 - input conversion means for converting the data received into a common computer protocol;
 - output conversion means adapted to convert data from the common computer protocol into a computer protocol selected as a function of a specific diagnostic tool;
 - output means for transmitting the converted data to a selected specific diagnostic tool;
 - routing means for selectively routing received data from said input means to one or more of said output means; and
 - control means for selectively configuring said routing means in real time.
2. The system of Claim 1 wherein said control means includes means for remotely configuring said routing means.
3. The system of Claim 1 including said control means includes means for selectively filtering the received data routed by said routing means.
4. The system of Claim 1 wherein said control means includes means for selectively storing a particular configuration of said routing means for use in the subsequent configuration of said routing means.
5. A diagnostic system comprising:
 - input means adapted to receive data relating to events from plural software applications in a common computer protocol;

output conversion means adapted to convert data from the common computer protocol into a computer protocol selected as a function of a specific diagnostic tool;

output means for transmitting the converted data to a selected diagnostic tool;

routing means for selectively routing received data from said input means to one or more of said output means for transmission to a diagnostic tool; and

control means for selectively configuring said routing means from a location remote from said routing means.

6. In a diagnostic system for plural computer applications each providing data in one of a plurality of data protocols, said system having plural diagnostic tools each responsive to data in one of a plurality of different computer protocols, the method of routing data from a selected application to a selected tool comprising the steps of:

- (a) converting all input data into a common protocol;
- (b) selecting the diagnostic tool for the data from one of the plural computer applications; and
- (c) converting the data in the common computer protocol from the selected computer application into a protocol determined by the identity of a selected diagnostic tool.

7. The method of Claim 6 wherein the conversion of data from all computer applications into a common computer protocol is accomplished in a single server.

8. The method of Claim 6 wherein the conversion of data from the common computer protocol into the tool specific protocol is accomplished in a single server.

9. The method of Claim 6 wherein the control of the application of data is in real time.
10. The method of Claim 6 wherein none of the plural applications are commonly located.
11. The method of Claim 6 wherein none of the diagnostic tools are commonly located.
12. The method of Claim 6 including the step of selectively filtering the converted data routed to the selected diagnostic tool.
13. The method of Claim 6 including the step of selectively storing a selected routing configuration for subsequent use.

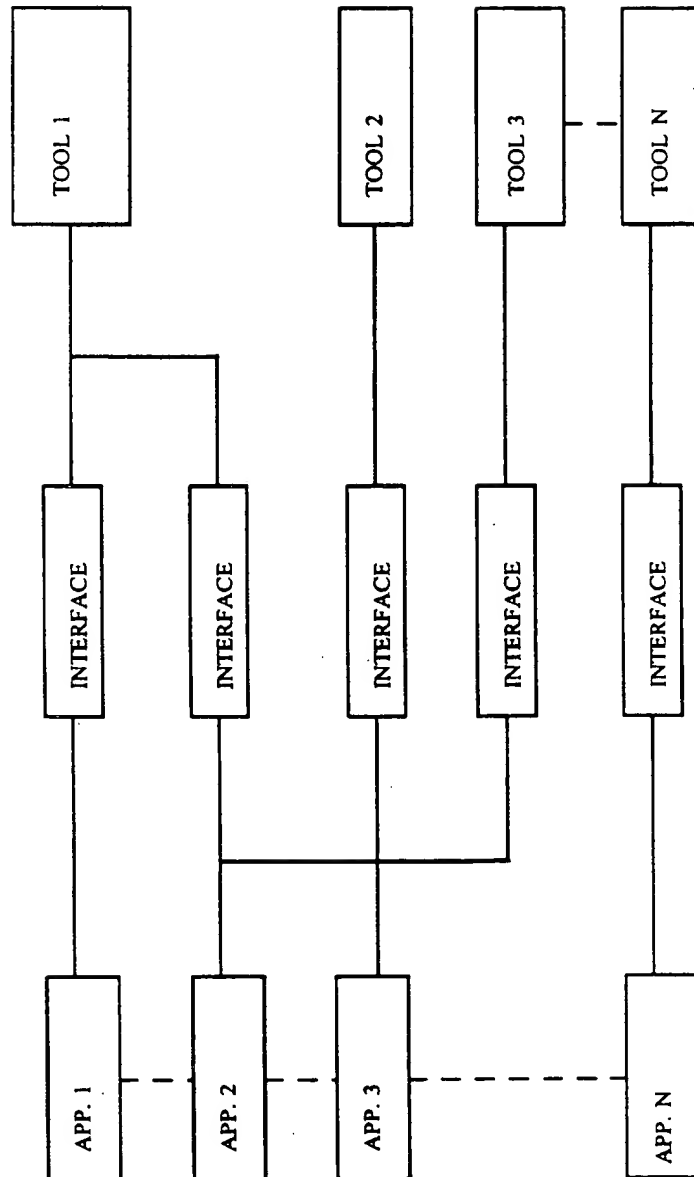


FIGURE 1
(PRIOR ART)

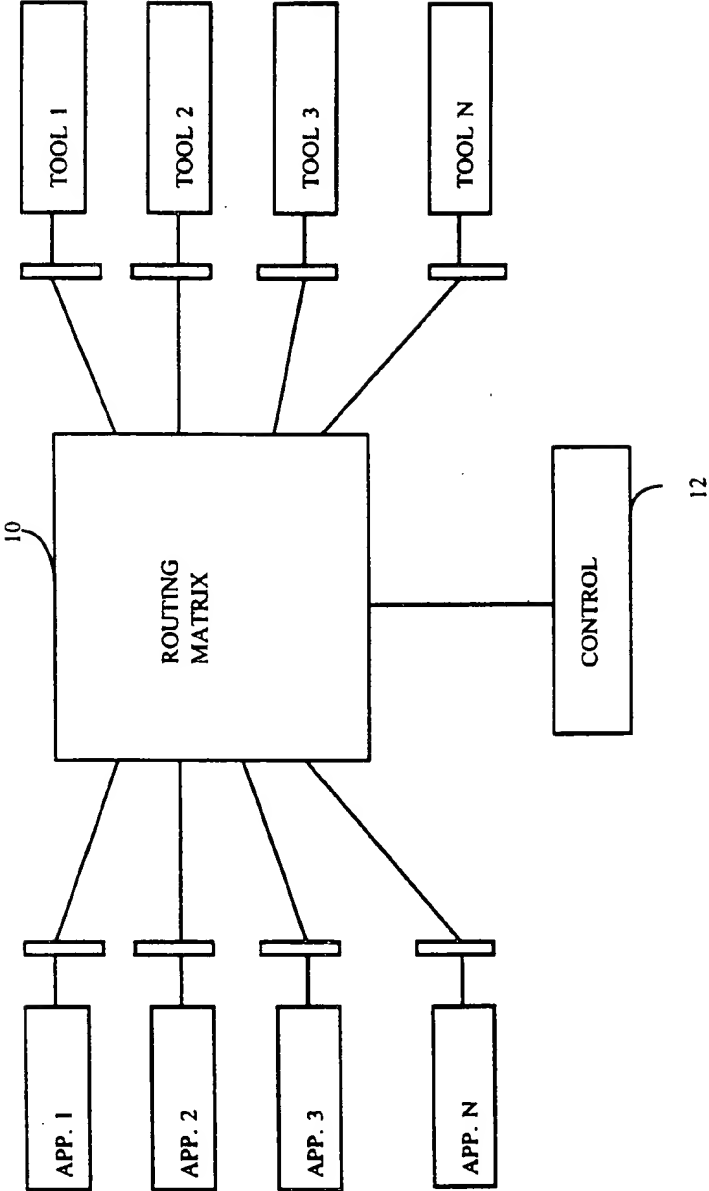


FIGURE 2

INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER IPC(6) : G06F 11/00 US CL : 395/704, 183.13, 200.54, 500; 370/241 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 395/704, 183.13, 200.54, 500; 370/241 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Please See Extra Sheet.		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,491,791 A (GLOWNY et al.) 13 FEBRUARY 1996, Abstract, col. 2 line 47 - col. 3 line 41.	1-13
Y	US 5,490,252 A (MACERA et al.) 06 FEBRUARY 1996, col. 8 line 56 - col.10 line 62, col. 16 lines 44-64, col. 17 lines 29 -35, col. 18, lines 17 -27, col. 20 line 42 - col. 21 line 7.	1-13
Y	US 5,239,662 A (DANIELSON et al.) 24 AUGUST 1993, abstract.	1-13
Y	EP 599,606 A2 (SIEGEL et al.) 01 JUNE 1994, Abstract.	1-13
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Date of the actual completion of the international search 02 NOVEMBER 1998		Date of mailing of the international search report 15 JUN 1999
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230		Authorized officer TARIQ R. HAFIZ <i>Joni Hill</i> Telephone No. (703) 305-9600

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B. FIELDS SEARCHED

Electronic data bases consulted (Name of data base and where practicable terms used):

APS, STN, GPI WEB CLIENT (WEST)

search terms: diagnostic tools, network, server, protocol conversion, applications